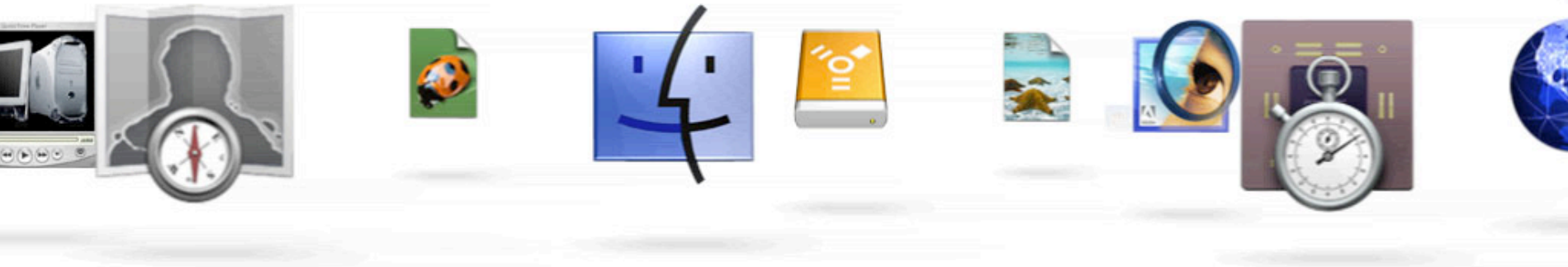




Wireless Directions

Session 806





Wireless Directions

Dave Russell

**Director, Worldwide Product Marketing
Wireless Products**

Paul Rekieta

AirPort Engineering Manager

Tom Weyer

**Network and Communications Evangelist
Worldwide Developer Relations**

802.11 and Bluetooth

What you will learn

- Purpose of 802.11 and Bluetooth
- 802.11 and Bluetooth differences
- Overlap of 802.11 and Bluetooth
- Lots of new features








Agenda

- Apple's Strategy for 802.11 and Bluetooth
- 802.11 Directions
- New AirPort Features in Jaguar
- Bluetooth Technology Preview 2
- Bluetooth Demo
- Q&A Session



Technology Leadership

	Wired	Wireless
Network	 Ethernet	 AirPort
Peripheral	  USB FireWire	 Bluetooth



AirPort and Bluetooth Strategy



Wireless Ethernet



“Wireless USB”



Wireless Technologies Compared

	802.11b	Bluetooth
Maximum Raw Data rate	11 Mbps	1 Mbps
Coverage Radius (at max data rate)	150 feet	30 feet
Frequency	2.4GHz	2.4GHz
Number of devices in net	Up to 50 clients	1 Master, 7 Slaves
Signal Power	32mWatt	1mWatt
Purpose	Wireless LAN	Wireless Peripherals

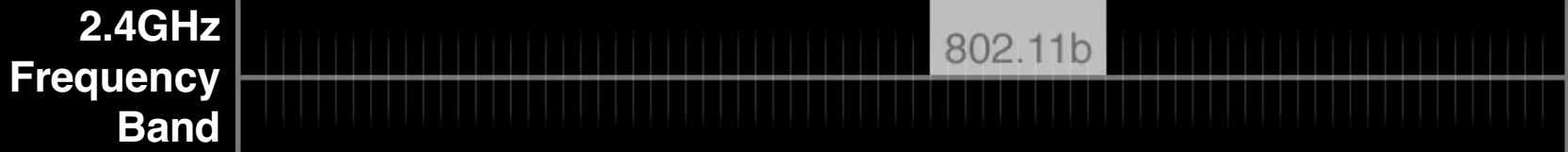



Do 802.11b and Bluetooth Interfere?

- Yes, randomly, but . . .
- . . . so do microwave ovens, cordless phones, etc.
- A packet lost in collisions between Bluetooth and 802.11b will be retransmitted at the next opportunity
- Bluetooth hops between 79 RF channels spaced 1MHz apart, 1600times per second, within a frequency spectrum from 2.4GHz to 2.4835GHz. Collisions are infrequent



802.11b and Bluetooth Co-existence



 Bluetooth



AirPort





AirPort



802.11 Directions

Pros and Cons of 802.11b and 802.11a

- Data Rate
 - *a* offers much higher data rate than *b*
- Range
 - *b* has a greater range than *a*
 - *a*'s data rate declines rapidly with distance
 - At long distances *b* provides faster data rate than *a*
- Power
 - *a* uses more power than *b* (est. 2x power draw)
- Availability
 - *b* and *a* products are both on the market



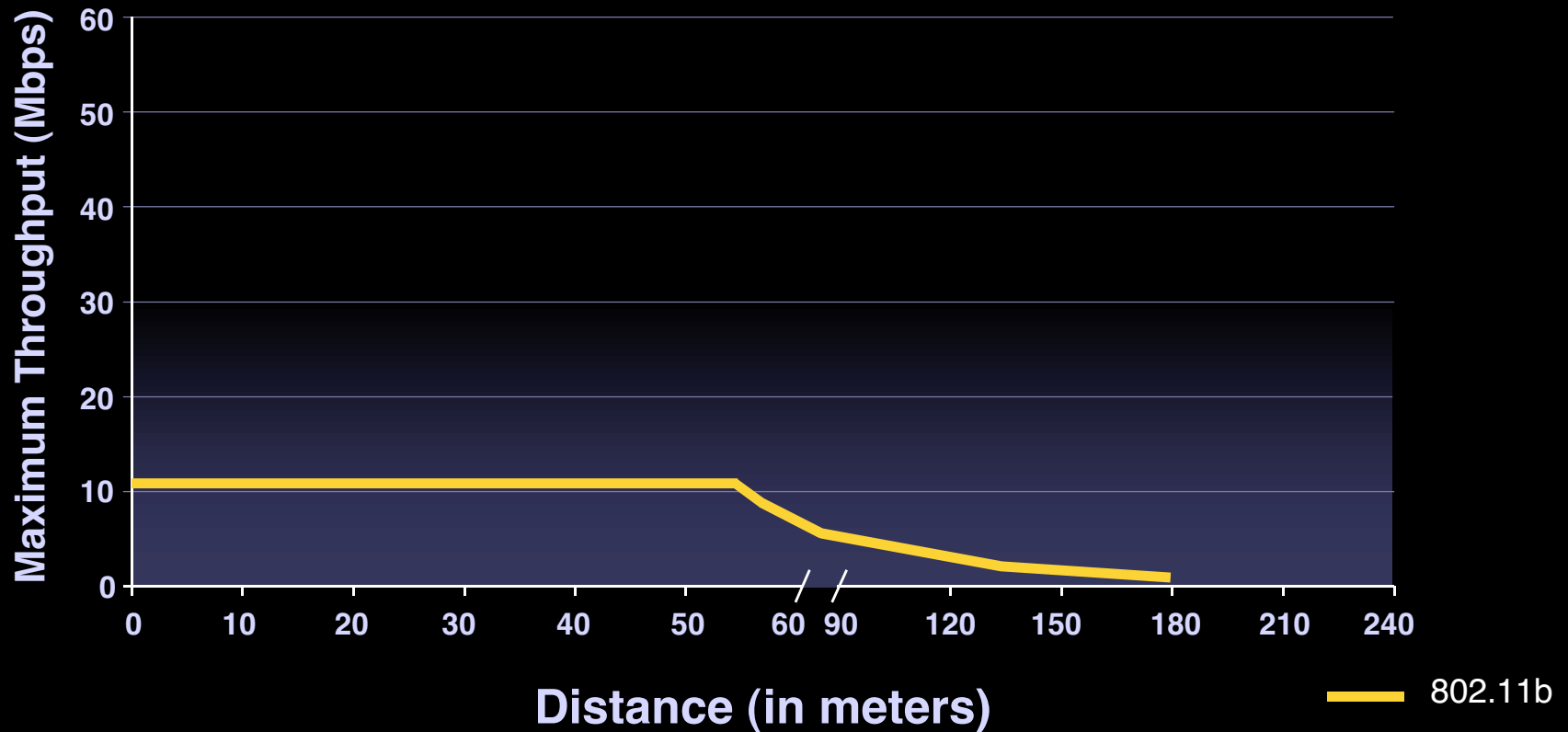
802.11 Standards Compared

	802.11b	802.11a	802.11g
Maximum Raw Data rate	11 Mbps	54 Mbps	54 Mbps
Coverage Radius (at max data rate)			
Radius	150 ft	≈ 38 ft	≈ 59 ft
Area	71K ft	4.5K ft	11K ft
Sphere	41M cu ft	229K cu ft	858K cu ft
Frequency	2.4GHz	5GHz	2.4GHz
Compatible with AirPort	Yes	No	Yes
Modulation Method	DSSS	OFDM	OFDM/DSSS



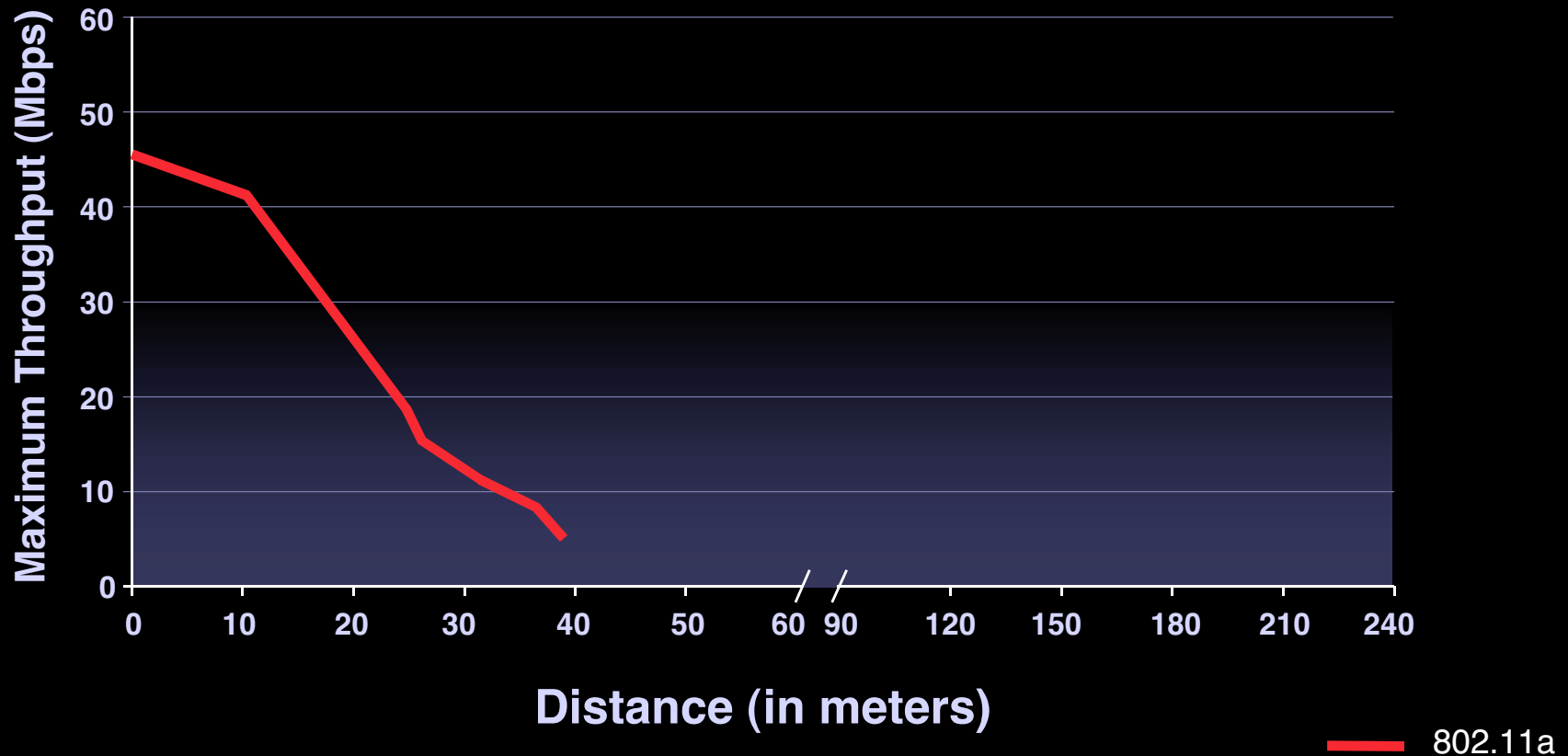
Data Rate vs. Range of 802.11b

Throughput by distance



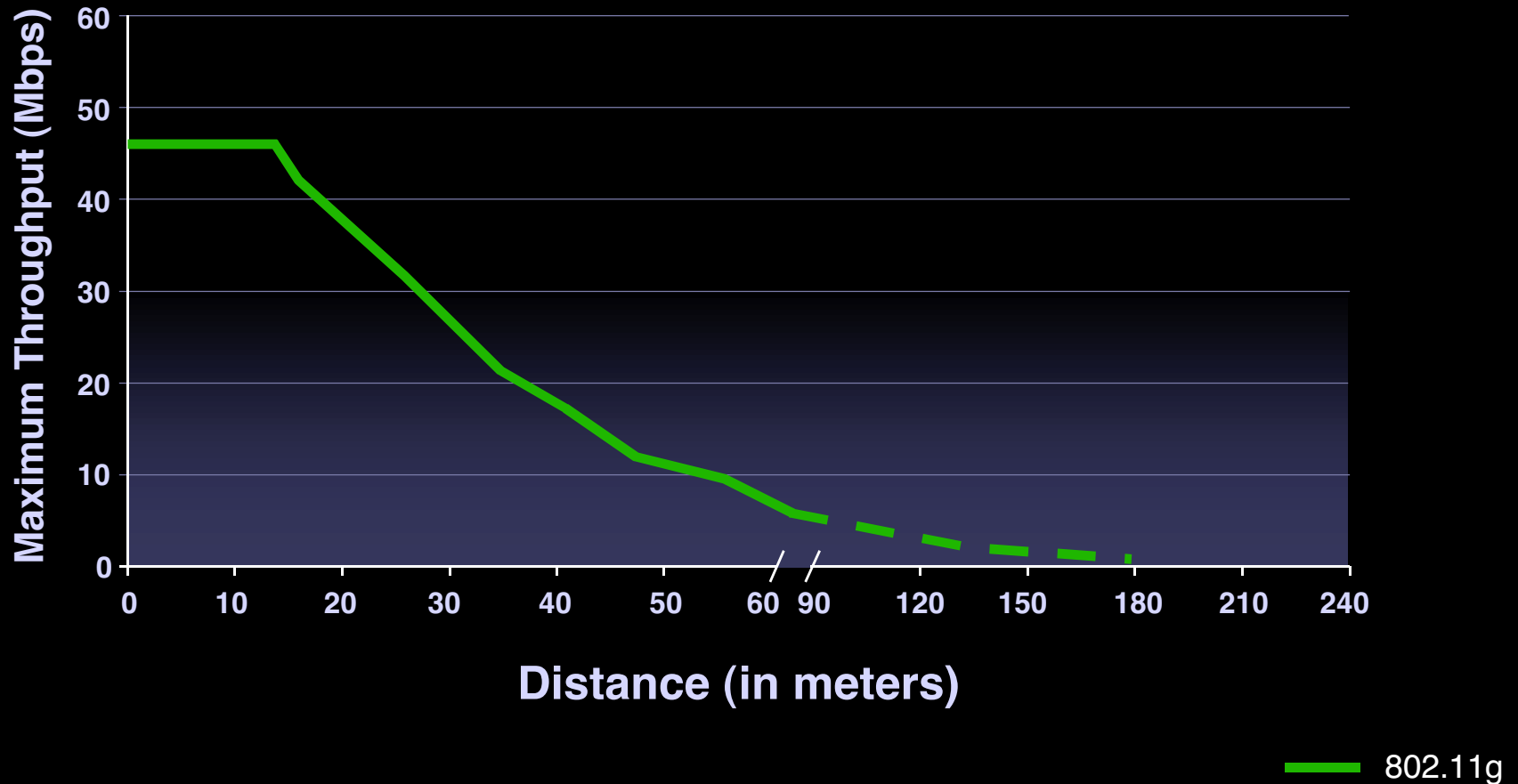
Data Rate vs. Range of 802.11a

Throughput by distance



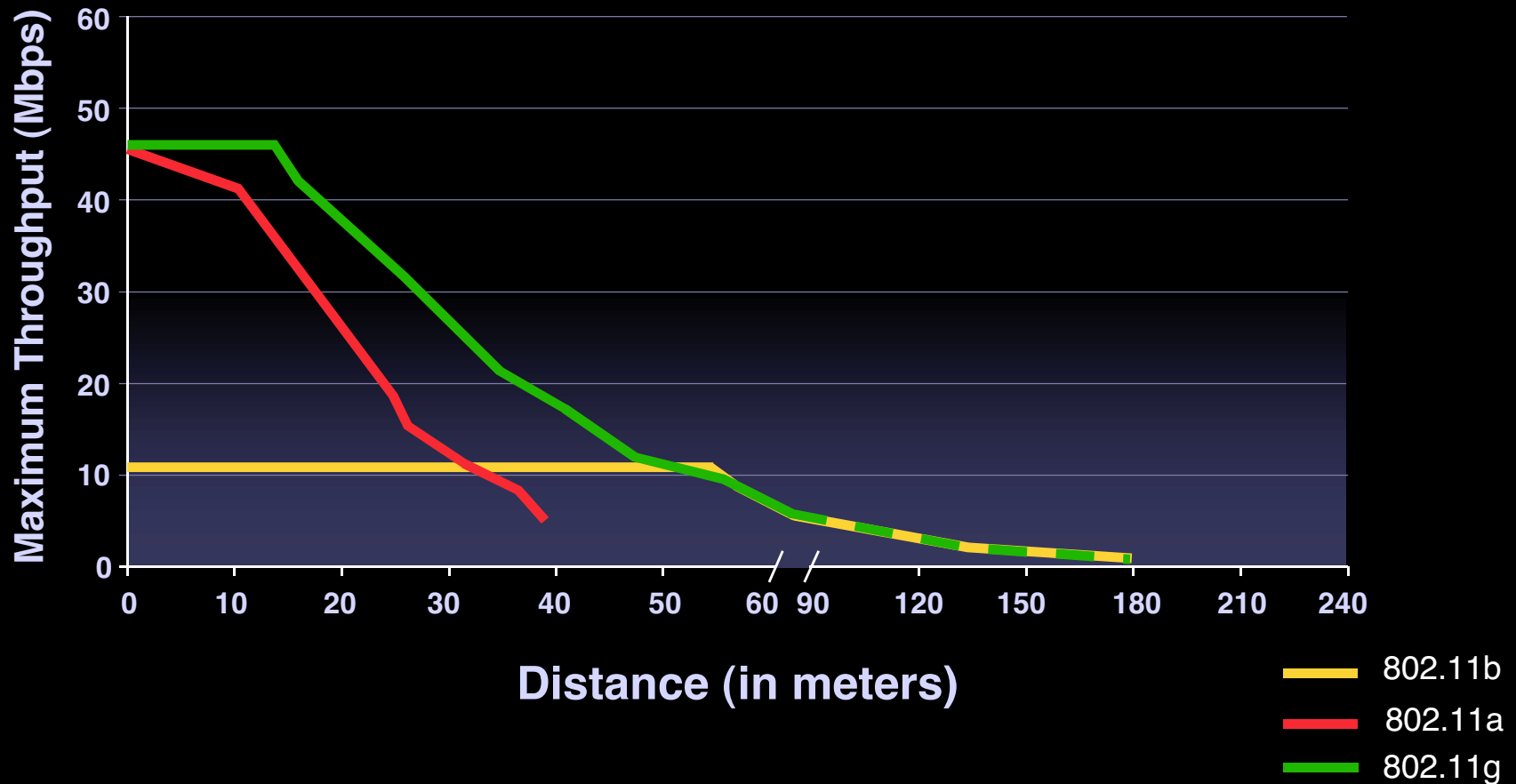
Data Rate vs. Range of 802.11g

Throughput by distance



Comparing 802.1 b, a, and g

Throughput by distance





New AirPort Features in Jaguar



Paul Rekieta
AirPort Engineering Manager

New in AirPort Base Station . . .

- More NAT gateways —PPTP and IPSec style VPN
- Port mapping works better
- Traceroute does
- Registers using Multicast DNS
- Zero Configuration Networking
- PPP Dial-in
- Option to disable SNMP on WAN
- DHCP Message Text Option



Paul Network

Restart Upload Default Password

AirPort Internet Network Port Mapping Access Control Authentication

Information in this section is used to identify the base station and configure the wireless network published by the base station.

Base Station

Name: Paul Network

Contact:

Location:

Change password... Enable SNMP access on WAN

AirPort Network

Name: Paul Network

Create a closed network

Channel: 1

Station density: Low

Multicast rate: 2 mb/s

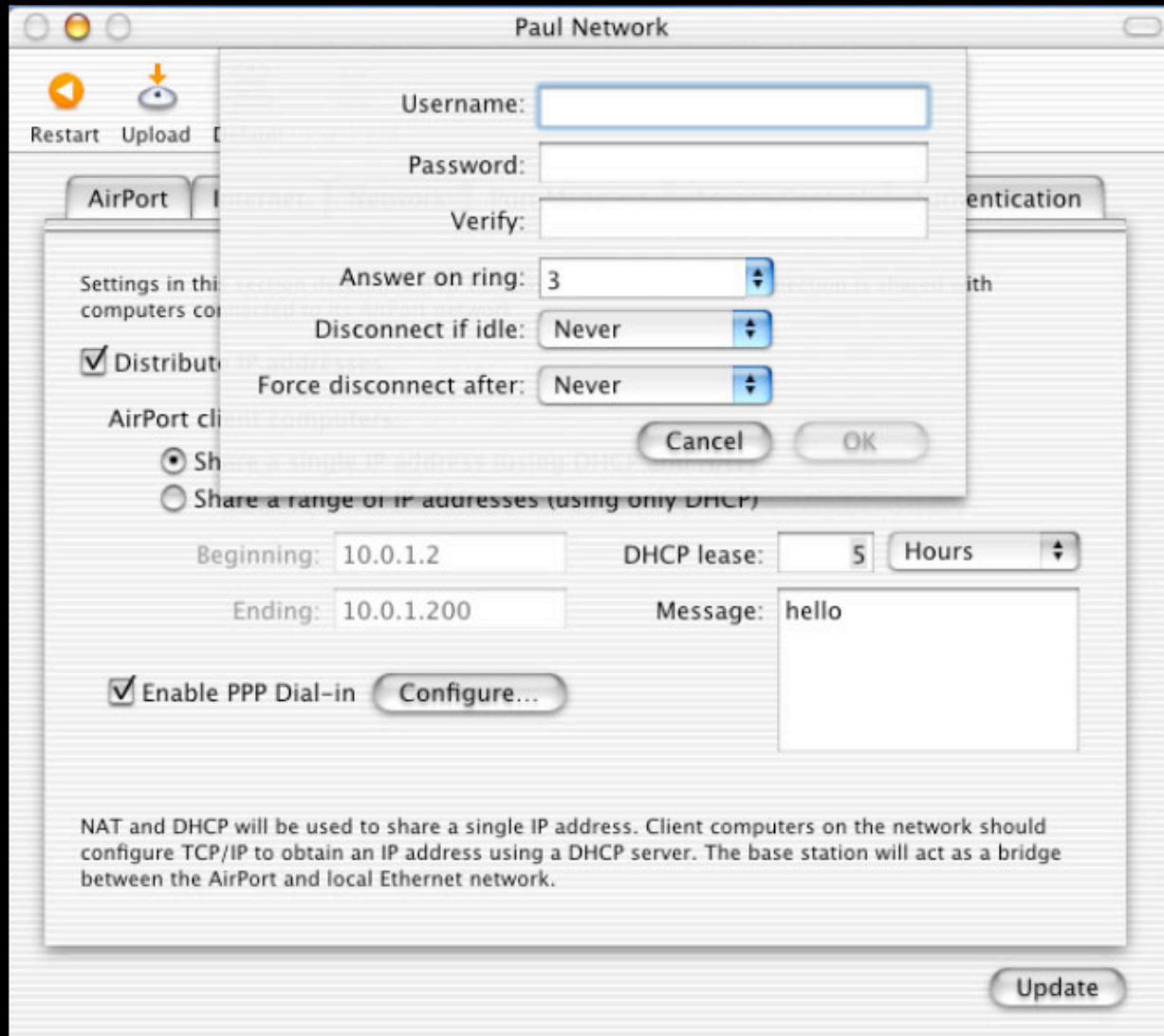
Enable interference robustness

Enable encryption (using WEP)

Change password...

Update

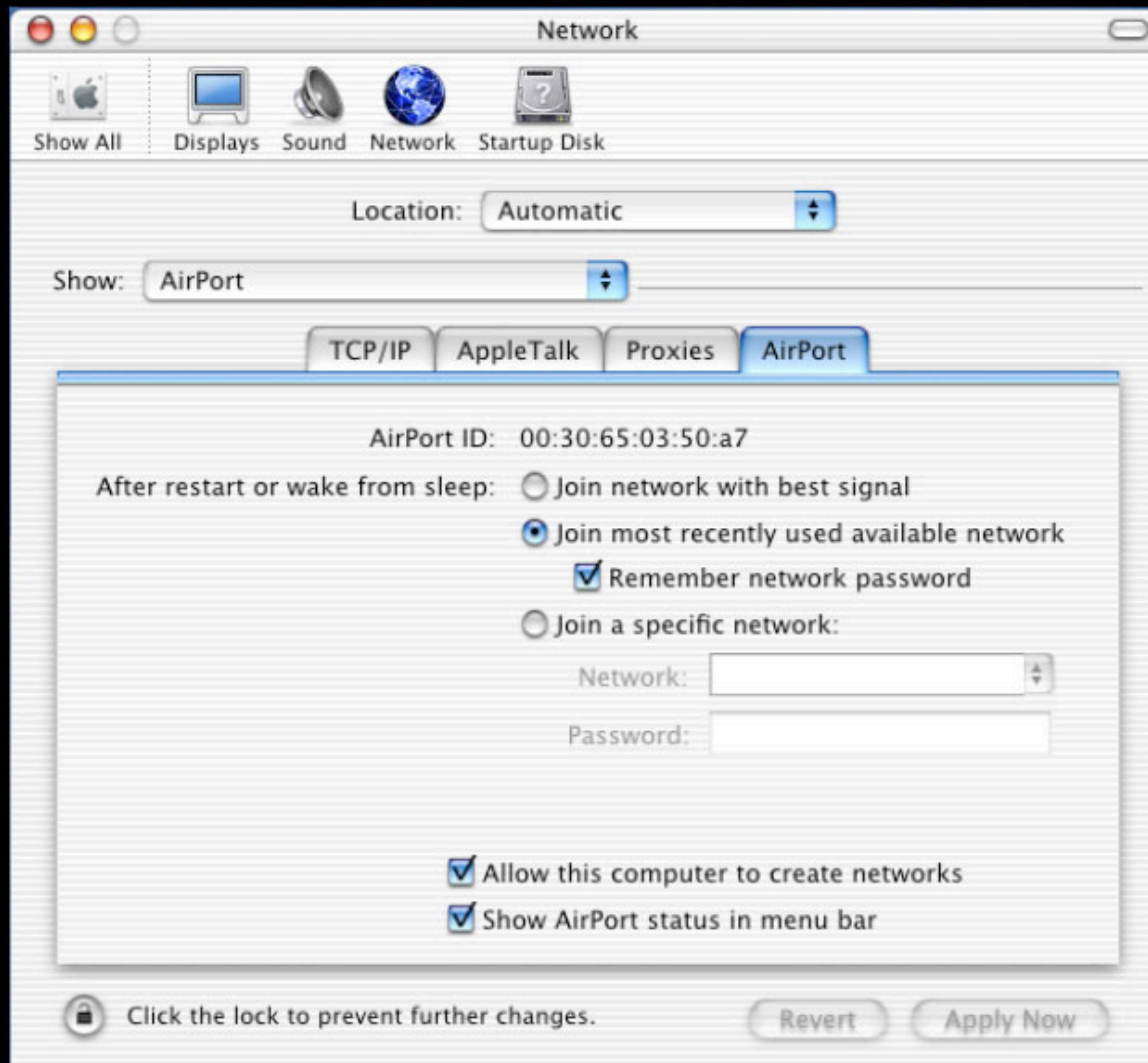




New in AirPort Client . . .

- Improved AirPort Network Preferences UI
- Option to prevent IBSS creation
- Base station discovery using Multicast DNS
- Auto-configuration of AOL client by Setup Assistant







Bluetooth Technology Preview



Tom Weyer
Network and Communications Evangelist
Apple Worldwide Developer Relations

What's Bluetooth?

- Open specification to enable short range wireless voice and data communication anywhere in the world
- Publicly available, royalty free
- Radio Module: very low power consumption, low cost, small size, worldwide use in the ISM band
- Profiles describe software protocols meant to ensure interoperability of devices



Bluetooth Technology Preview

Profiles supported

- Dial-up Networking (Cell phone client)
 - Internet connect
 - IrDA replacement
- Serial Port
 - Palm OS PDA synchronization
- Object push (OBEX)
 - Enables send and receive of small files
 - vCard push and receive



Bluetooth Technology Preview

Devices supported

- PDAs
 - Palm 5XX with Bluetooth SDIO Card
 - Sony Clie with Bluetooth Memory stick
 - Palm V series with Red-M sled
 - Handspring Visor with Red-M expansion module
- Phones
 - Ericsson: R520, T39, T68, T68i
 - Nokia: 6310
 - NTT DoCoMo Paldio 633S



Bluetooth Technology Preview 2

Demo of Profiles

- Palm to Mac
 - HotSync of 515 to PowerBook
 - Serial Port Profile
- Palm to Mac
 - vCard from Palm to PowerBook
 - Object Push Profile



Bluetooth Technology Preview 2

Demo of Profiles

- Mac to Mac
 - Image drag from iPhoto to Bluetooth File Exchange PowerBook to PowerBook
 - Object Push and auto launch
- Mac to Phone
 - Object Push from PowerBook to Sony/Ericsson T68i





Demo



Bluetooth Technology Preview 2

- Create outgoing serial ports
- Pair to devices other than phones
- Developer SDK
 - Sample code, headers, and doc
 - OBEX, RFCOMM
 - Posted to the web this afternoon
 - Details in session 807—Bluetooth in Depth



For More Information

- Bluetooth Specification Version 1.1,
downloadable from Bluetooth SIG
<http://www.bluetooth.org>
- “Bluetooth Connect Without Cables,”
 - Bray, Sturman, Mendolia
 - ISBN: 0130661066
- Wireless Ethernet Compatibility Alliance
<http://www.wi-fi.com/>
- IEEE
<http://www.ieee.org>



Roadmap

809 Advanced Mac OS X Networking

Room C
Thurs., 9:00am

811 Zero Configuration Networking

Room J
Thurs., 2:00pm

803 Mac OS X Networking Overview

Room A2
Tue., 9:00am

807 Bluetooth in Depth:
In depth discussion of Bluetooth APIs

Room A1
Wed., 10:30am



Who to Contact

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Bluetooth Developer Mail List

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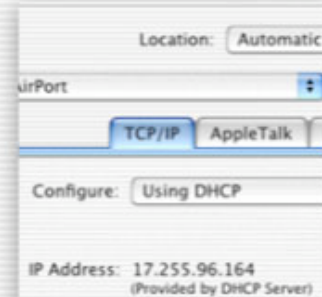
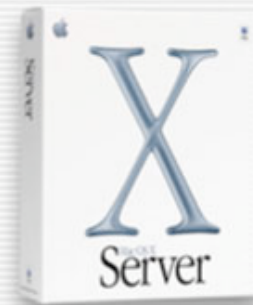
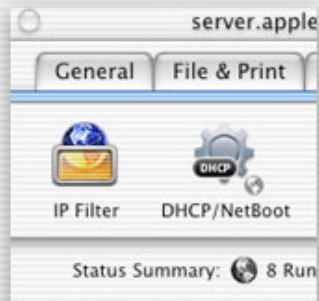
<http://www.lists.apple.com/bluetooth>

<http://developer.apple.com/wwdc2002/urls.html>





Q&A



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<http://developer.apple.com/wwdc2002/urls.html>

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